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ARMY AVIATION MAINTENANCE--WHAT IS NEEDED?

BY

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ARMY AVIATION MAINTENANCE--WHAT IS NEEDED?

AN INDIVIDUAL STUDY PROJECT

by

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ABSTRACT

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Army Aviation is an indispensable part of the modern battlefield. However, the increasing complexity of the aircraft and the tempo of the modern battlefield stress existing maintenance capabilities. The two most serious problems constraining aviation units today are identified as inadequate manning and an inefficient support structure. Current initiatives to resolve those problems are reviewed and analyzed for adequacy. Finally, alternate solutions are proposed and discussed. To provide historical perspective, a summarized history of the structure of Army aviation maintenance from 1909 to the present is incorporated into the paper.



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INTRODUCTION

No one questions the importance of rotary wing aircraft in today's army. Any lingering doubts were dispelled by their exceptional contributions during OPERATION DESERT STORM. The first and last shots of this recent war belonged to Army Aviation. Army AH-64 attack helicopters flew deep into Iraq under cover of darkness to punch a massive hole through the Iraqi air defense network. That successful attack opened the way for the initial Air Force attacks. Forty-five days later, attack helicopters of the 24th Division closed the war by destroying over 100 Iraqi tanks and armored vehicles that were attacking U.S. forces shortly after the ceasefire.¹ In between those two events, army helicopters executed the largest air assault in history, moved tons of war materiel, provided command and control, destroyed large numbers of enemy vehicles and evacuated wounded from the battlefield.

Army aviation has come a long way from the early days of World War II and the Korean War. Then, fragile fixed wing aircraft provided a modest observation capability, and primitive helicopters struggled to lift small payloads short distances. The capabilities of the aircraft and the demands placed on them by modern doctrine have increased dramatically. It would be hard to imagine a modern battlefield without the helicopter. However, there is a price to

battlefield without the helicopter. However, there is a price to pay for these startling advances. Modern rotary wing aircraft are many times more complex than their predecessors of only a few years ago and more difficult to maintain.

To illustrate that point graphically, compare the Vietnam era's most modern gunship, the AH-1G Cobra, and the newest attack helicopter, the AH-64A Apache. The AH-1G had only two rotor blades and a single engine. It was armed with simple free flight rockets and a chin turret. The chin turret typically mounted a 7.62mm minigun and a 40mm grenade launcher. The rockets were aimed and fired using a simple optical sight. The chin turret was controlled and fired by the co-pilot using a flexible hand held optical sight. Although sophisticated for its time, its systems were primarily mechanical and used only limited electronic interfaces.

The AH-64 is dramatically more complex. Two engines, each more powerful than the AH-1G's single engine, provide power to a four blade rotor system. Instead of the simple add-on systems of the AH-1G, the AH-64 has complex integrated electronic systems. Radar and laser warning devices coupled with chaff dispensers, radar jammers and infa-red jammers protect the aircraft. Complicated optical systems give the crew the ability to see at night and through many battlefield obscurants, all at significant distances. The free flight rockets of the AH-1G have been replaced by much more accurate versions with multiple fusing options that are selected from the cockpit. The sighting system for the rockets is linked to a computer that accounts for climatic conditions and

determines the point of aim. Distances are computed with a laser range finder. The primary weapon is now the laser guided Hellfire missile. This missile is devastatingly accurate and overwhelmingly destructive. In the last battle of OPERATION DESERT STORM mentioned earlier, 107 Hellfires were fired and only five of them missed.² A 30mm cannon linked directly to the pilots helmet sight replaces the old chin turret.

The pilots helmet is a marvel of technology. Small sensors in the cockpit of the helicopter keep track of the pilots head movements by reading the position of the helmet. A monocular view of the outside world is projected into a small cathode ray tube positioned over the pilot's eye. Even the landing gear is more sophisticated. Crash absorbing struts with wheels replace the simple skid landing gear of the AH-1G. Everything is more capable but many times more complex.

A similar comparison between other current aircraft and their Viet-Nam era predecessors would give the same sharp contrast in capabilities and complexity. The UH-1H "Huey" versus the UH-60 Blackhawk, the OH-6A Cayuse versus the OH-58D Kiowa Warrior or the CH-47A Chinook versus the CH-47D Chinook.

Coupled with these startling advances in technology the doctrine of the battlefield has evolved. AirLand Battle is the term used to describe the Army's current doctrine. It stresses battles of considerable movement with the ultimate goal of bringing overwhelming firepower on enemy forces. There is little time in AirLand Battle for friendly forces to rest and recover. The tempo

of the battle is too high. The successor doctrine to AirLand Battle is being developed under the umbrella term of AirLand Operations. It will put a premium on forces capable of being moved anywhere in the world at short notice and fighting the same type of swift, violent conflict.

The cumulative effect of all this change stresses the current aviation maintenance system. The Government Accounting Office (GAO) announced that the AH-64 was seriously undermaintained prior to the Gulf War. In their words, "the Army has too few Apache mechanics. About 100 maintenance personnel assigned to an Apache battalion take care of 39 helicopters, including 18 Apaches. The Marine Corps, however, achieves far more flying hours with 225 technicians taking care of 24 simpler helicopters."³ Worldwide readiness rates for the Apache were reported to be at 49% instead of the required 70% level.⁴

Has aviation maintenance kept up with the rapid advance in complexity and intensity? This paper will explore the evolution of Army aviation maintenance and how it is currently structured to support the force. The two most difficult problems facing aviation maintenance today will be identified and discussed. Finally, some of the proposed changes being developed to improve support will be analyzed. This paper will focus on the maintenance organizations supporting the Army's rotary wing fleet at the Corps level and below. However, the term maintenance is misleading. Other facets of the logistic support system such as fuel, ammunition, vehicle repairs and supply are often grouped under the umbrella term

aviation maintenance. Those logistic functions are similarly stressed by the increased support demands of aviation units. Since it is difficult to talk exclusively about maintenance without mentioning those functions, there will be some limited coverage of other forms of logistic support.

HISTORY OF ARMY AVIATION MAINTENANCE

The Army accepted its first airplane on 2 August 1909.⁵ In the early days of army aviation, there were no formal organizations or maintenance procedures. Pilots were often their own mechanics, and everyone learned on the job.

By 1918, the pressures of larger organizations and more complex machinery forced order and structure upon aviation units. A primary goal of early planners was to make a combat squadron that was light and mobile but capable of supporting its organic aircraft. To develop a comprehensive maintenance system that provided rapid turnaround and kept the flying squadron as self contained as possible, a maintenance echelon system was established.⁶ A four echelon structure was developed consisting of the Group for repair at the local level; the Mobile Park with mobile shops and more complex repair equipment; the Air Depot; and finally the Production Center.

By 1940 the echelon system had evolved into a more sophisticated system:⁷

First Echelon was crew chief repair in the combat unit. It was primarily simple tasks.

Second Echelon was also crew chief maintenance, but the tasks were more complex and required the tools and assistance of the service squadron supporting the unit.

Third Echelon maintenance occurred at sub-depots, not normally

co-located with the flying unit. Maintenance at this level required heavy machinery or special skills.

Fourth Echelon maintenance was done at Air Depots, and was reserved for the most difficult and time consuming tasks.

Even though aircraft were still relatively simple, mechanics trained in a formal course lasting six months, and were qualified in almost all the aircraft systems.⁸. Systems to formalize record keeping were in place and the basic foundation of the future maintenance structure for Army aviation was in place.

The echelon system survived World War II basically intact, but some changes occurred. There was a general realization that a rigid adherence to the echelon system was not always productive. Under the pressures of war, complex work was often done at lower echelons of maintenance because it was faster and more efficient. The "jack of all trades" mechanic was replaced by specialists. Skill specialization allowed the training base to produce trained soldiers more quickly and sped up the repair of aircraft.⁹

After the separation of the Army and Air Force in 1947, the Army initially continued the four echelon system of aviation maintenance. Eventually the Army developed an independent way of doing things and by the end of the 1950's had established a five echelon, three category system. The first category was Organizational Maintenance and included the first and second echelons of work. First echelon work was primarily crewchief, and second echelon was done by an organic maintenance platoon within

the unit. Field Maintenance included the third and fourth echelons of maintenance. Small teams, popularly called "KD" teams because of the their paragraph designation in the organization documents, provided third echelon capability in non-divisional units.¹⁰ Divisional units received their third echelon support from Transportation Field Maintenance Detachments. Transportation Army Aircraft Maintenance (TAAM) companies gave third echelon support to other type units on an area basis. The TAAM could also back up "KD" teams and the Transportation Field Maintenance Detachments. Heavy Maintenance and Supply Companies backed up the TAAM's and did fourth echelon maintenance - usually at a ratio of one company to every 1000 aircraft. All this structure was backed up by civilian third and fourth echelon shops throughout the United States.¹¹ Depot maintenance was the final category and the fifth echelon.

A five echelon, four category system evolved by the early 1960's. First and second echelon maintenance remained in the unit and was categorized as Organizational Maintenance. Third echelon maintenance was no longer called field maintenance but was now called Direct Support Maintenance. Transportation Aircraft Maintenance Companies (TAMC) did direct support work for both divisional and non-divisional units.¹² The fourth echelon of maintenance was called General Support Maintenance. Transportation Aircraft Maintenance General Support (GS) Companies did fourth echelon work. The fifth echelon of maintenance was still called Depot Maintenance.

In 1962 the Howze board proposed some dramatic changes to the

five echelon system, calling it "unsatisfactory for aircraft maintenance and logistic support."¹³ They recommended the adoption of a three level system designated: "A" for user; "B" for support and "C" for depot. These proposals were implemented when the 11th Air Assault Division was formed in 1964 as a test unit for the airmobile concept. They stayed in effect as the 11th Air Assault was redesignated as the 1st Cavalry Division and deployed to Viet-Nam. However, they new concepts and terms enjoyed little support and by late 1965 had fallen into disuse.¹⁴

The Army used the four categories of aviation maintenance in Viet-Nam but numerous "ad hoc" solutions for providing support developed. Organizational units retained their "KD" teams to do direct support work. These detachments were often augmented to the point where as much as 80% of direct support maintenance was done at the organizational level.¹⁵

All echelons of aviation maintenance were eventually located in Viet-Nam. The depot echelon was represented by the U.S.S. Corpus Christi Bay, a ship converted into a floating depot. In fact, an overwhelming number of supporting units ended up in Viet-Nam:

"Army aircraft...increased to a peak of 4,228 by September 1969. They were assigned to...142 company-sized units plus a number of smaller detachments...of the 142 companies, 63 were organic to division, brigades, or squadrons and had their organic direct support maintenance capability. the remaining company-sized units were supported by cellular direct support detachments. The 34th General Support group had two depot companies, five general support companies, 11 direct support companies, four aviation electronics companies, and the Aviation Materiel Management Center. ... over 2000 contract maintenance personnel augmented maintenance units, and...there were 151 field service

representatives."¹⁶

Post Viet-Nam analysis indicated that this heavy concentration of maintenance at the direct and general support echelons was uneconomical. There was waste and duplication of services, and as noted earlier, much of the actual work was done at the organizational units with their integrated direct support maintenance (IDSM) or "KD" teams. A move to a three echelon system, combining direct and general support was recommended and eventually implemented.¹⁷

PRESENT ARMY AVIATION MAINTENANCE STRUCTURE

Somewhere during the transition to the three echelon system we have today, the term echelon was replaced by the simpler term "level". The present three level system of aviation maintenance was incorporated into the Army's structure in the late 1970's. Approximately 60% of the direct support functions moved forward into organizational units. This new level is called Aviation Unit Maintenance (AVUM). The remaining 40% of direct support functions and about 40% of the general support mission moved to a middle level of maintenance. That level is called Aviation Intermediate Maintenance (AVIM). The remaining general support tasks migrated to the third and final level, Depot Maintenance.¹⁸

There are still four categories of maintenance in the three level system; crew chief/organizational, AVUM, AVIM and Depot. Aviation companies/troops retain the ability to do limited crew chief maintenance, but for more sophisticated AVUM level work, each battalion/squadron has an AVUM company. Divisional Aviation Brigades receive intermediate support from an AVIM unit which is doctrinally assigned to the Division Support Command (DISCOM). In actual practice, this unit often falls under the operational control of the aviation brigade commander.¹⁹ Non-Divisional aviation units are supported by a Corps level AVIM unit assigned to the Corps Support Command (COSCOM).

The three level system simplifies the maintenance process by

removing layers of maintenance and consolidating activities in fewer locations. It also allows for a decrease in structure and personnel - an attractive prospect in an army looking for ways to hold down the size of organizations.

Efforts to try and reduce those three levels even further and move to a two level system occurred during the mid 1980's. Those two levels would have been organizational and depot. Organizational maintenance units would perform preventative maintenance, do limited troubleshooting of defective components, and replace parts as modules. Very little repair work would be done at the unit level. Most work would be evacuated to the depot level of maintenance. The development of the Light Helicopter Experimental (LHX) (now called the RAH-66 Comanche) provided the impetus for this effort to further streamline the support system.

An extensive investigation of the relative advantages and disadvantages of a two level versus a three level system concluded that the two level system would not be better. The study group summarized their findings by recommending, "...the Army would be served best by continuing to design the LHX for two-levels of maintenance, but introducing it into service under the three-level system, and retaining its present three-level system for all other (current) aircraft."²⁰ Based on the results of that study, there is no effort underway currently to abandon the three-level system, and it will probably take us into the next century.

PROBLEMS IN THE CURRENT SYSTEM

There are many identified problems reducing the capability to properly maintain the Army's rotary wing aircraft. Poor component design; insufficient numbers of special tools; tools that are difficult to use, or that do not work at all; poor test, measuring and diagnostic equipment; and unresponsive parts resupply are all difficult problems that burden aviation units. However, those problems have always existed and are well recognized deficiencies. They are usually resolved as newly fielded aircraft and systems mature. The major underlying problems that have a crippling effect on Army aviation are more serious and more basic. They distill into two difficult issues that this paper will examine. The first issue is the debilitating problem of undermanned aviation units. The second issue is the lack of a cohesive and effective support structure for aviation units at the Corps level and below.

Manning:

The GAO investigations of the AH-64 Apache publicized a problem that aviation commanders were all too familiar with. As noted in the introduction, the GAO concluded the Army had too few mechanics. The problem was particularly notable in the new AH-64 battalions that were moved into United States Army Europe (USAREUR) during the late 1980's and early 1990's. Everything seemed to conspire to drive those unit's readiness levels to record lows. The first battalion to reach the Army's 7th Corps recorded a 22% mission capable rate in January of 1988!²¹

Current organization documents do not reflect full personnel requirements. They were developed using a manpower allocation and resource criteria (MARC) model termed the Interim MARC (I-MARC). The I-MARC is now widely believed to have been inaccurate since it usually understated actual requirements. It has been replaced by a newly developed aviation MARC. Making the problem even worse, aviation units were "capped" at a level below even the I-MARC authorizations. The unfortunate result is that aviation battalions have fewer maintainers per aircraft than armor and mechanized infantry units have per tank or fighting vehicle.²² The problem is particularly acute at the AVIM level of maintenance where all units are manned 25 to 30% below their I-MARC authorized levels.²³

However, it is prevalent in all aviation organizations. The AH-64 Attack Battalion was knowingly constructed more than 100

people short of the I-MARC documented requirement.²⁴ A UH-60 Combat Aviation Company has an I-MARC requirement for 54 maintainers but a "capped" authorization for 43.²⁵ That UH-60 company is already 20% understrength if everyone authorized is present for duty. This problem is multiplied when units do not have 100% of their authorized personnel assigned, a fairly common occurrence in most organizations. General Saint, the USAREUR commander, was so impressed by the magnitude of the problem, that in 1990 he stripped force structure from other units to "pay" for a 35 man plus-up in each of the European AH-64 battalions to make them more robust and capable.²⁶

An extensive analysis of AVUM and AVIM manhour capabilities in comparison to manhour requirements was recently completed at the United States Army Aviation Logistics School. The results of that study highlight the problem. A typical aviation brigade in an Army heavy division has just enough theoretical AVUM manhour capabilities to maintain its aircraft at desired readiness rates in peacetime. However, in wartime the anticipated workload exceeds capabilities by over three times. An additional 650 maintainers would have to be assigned to the Brigade to correct that shortfall in capability over an annual period.²⁷ If AVIM units had excess capabilities, AVUM units could count on some relief, but the shortfalls in manhours exist there at almost the same rate.

There is an additional factor that exacerbates this already difficult situation. The Army goal for Direct Productive Maintenance Man Hours (DPMMH) as a percentage of duty hours is 50%

in peace or war.²⁸ In the past few years, repeated studies have shown that most aviation units are lucky to get 30% DPMMH from their assigned maintainers. The former Aviation Branch Chief, Major General Rudolph Ostovich III, recently stated, "The fact that aviation mechanics typically spend only 23 percent of each duty day performing productive aircraft maintenance makes achieving DA readiness standards extremely difficult."²⁹

The readiness of Army aircraft in OPERATION DESERT STORM seems to refute all of this gloomy analysis. The aircraft deployed to Southwest Asia routinely met or exceeded readiness standards. The AH-64 set all time records, with Mission Capable (MC) rates in the low 90 percent range during the first part of February 1991.³⁰ All other rotary wing aircraft in the Gulf had similar, if not as spectacular showings. But this temporary surge in readiness was created through an unusual combination of circumstances that can not be counted on in a future conflict.

The deliberate buildup of forces in Saudi Arabia gave ample time to develop an extensive additional aviation maintenance capability. A comprehensive depot capability was moved to Saudi Arabia under the auspices of the Army Aviation Systems Command and called the Theater Aviation Maintenance Program - Saudi Arabia (TAMP-SA). Large numbers of civilian contractors in this organization provided an on site capability for sophisticated repairs. This dramatically reduced the normal turn around time associated with the repair of components and provided a pool of equipment and expertise not normally available.³¹ A large and

robust theater AVIM backup capability also deployed. Typically this large AVIM structure established forward support sections that stayed with their supported units and developed a habitual support relationship, similar to the old KD teams.³²

Aviation units focused their efforts on preparing for the war. With few other distractions, maintenance personnel met and exceeded the 50 percent level for DPMMH. Special procedures for stockpiling and receiving critical parts reduced the waiting time for resupply to only a few days. Civilian technical representatives were readily accessible and assisted in troubleshooting and diagnosing problems. Many units deployed with additional maintenance personnel, well over their normal authorizations. Personnel were stripped from non-deploying units to increase the capabilities of those going.³³ Finally, the war did not stress the aircraft or the maintenance system. With the exception of a few missions, the bulk of the combat flying occurred in the four days of the ground war. Little resistance or combat damage that would require extensive repair occurred. The environment with its heat and fine sand presented some early difficulties, but maintainers had ample time to develop innovative fixes and acquire new equipment.³⁴

Support Structure:

Significant change in the size, structure and organizational location of aviation units occurred in the post Viet-Nam period. Divisions and Corps now have aviation brigades, with most of the available aviation consolidated in that brigade. Unfortunately, the support structure and systems for those units still lag behind the advances being made elsewhere.

When the commander of any type of combat brigade other than aviation looks for logistic support, he goes to a Forward Support Battalion (FSB). The FSB is assigned to the DISCOM, but has an habitual relationship with the brigade it supports. In effect, the FSB provides "one stop shopping" for a brigade.

An aviation brigade commander who needs support beyond that of his organic resources has to go to multiple locations. Aviation maintenance can be found at the AVIM company, but medical, fuel, ammunition, and ground vehicle support come from other units located in the Main Support Battalion (MSB) of the DISCOM. Those units have multiple customers and naturally have to focus their attention and efforts equally on all of them. This often results in less responsive support to the aviation commander.

Once again, the DESERT SHIELD/STORM lessons can be misleading here. The deliberate buildup and preparation for combat included stockpiling all of the necessary fuel and ammunition. Large numbers of additional support units and vehicles were rushed into

theater and numerous ad hoc organizations established to provide logistical support to aviation units. In future conflicts without the time to build critical support and stockpile equipment, a more responsive support structure will be needed.

Current Initiatives to Fix the Problems:

The problems in aviation units have not escaped the notice of Army leaders. In August of 1990, Headquarters, Department of the Army, chartered a special study - the Aviation Requirements for the Combat Structure of the Army V (ARCSA V). The major purpose of the ARCSA V study is to develop the aviation force structure for the 1995-2004 timeframe to implement the AirLand Operations concept. AirLand Operations is the evolving doctrine of the U.S. which will replace the current doctrine, AirLand Battle.

The requirements of the new doctrine will demand a force that is easily transported to any location in the world from the United States. Highly mobile, lethal organizations that can sustain themselves will be at a premium under AirLand Operations.

ARCSA V itself is divided into five sequential parts or areas of study. They are: (1) An overall look at the new strategic threat and Army force structure projections for the future to determine the broad impacts on aviation force structure, requirements and capabilities. (2) An examination of Army operation and tactical doctrine at corps and division level. This will result in a determination of the numbers, types, and capabilities of aviation units required to execute the doctrine. (3) An examination of the future operational concepts for aviation to determine the number, types, missions and capabilities of the aviation units which will be needed to execute the operational concepts. (4) The actual design of standard aviation units to support the tactical and operational imperatives developed in parts

2 and 3. (5) Finally a wrap up and consolidation effort will produce the recommended aviation force structure in summarized form, with rationale; force design documentation; and a study report.³⁵ As important subsections of the ARCSA V study, the recommended manning levels for aviation units and the structure of their support organizations are being developed.

There doesn't seem to be any doubt that the end result of the study will recommend sharply higher ratios of maintainers to airframes in their final unit designs. The initial designs by the United States Army Aviation Logistics School are all more robust organizations with more personnel.³⁶ However, whether the Army will be able or willing to implement those changes remains questionable.

The development of new support structures is well along and is coupled with a major overhaul of all battlefield support being undertaken by the Combined Arms Support Command (CASCOM), a subordinate command of the Training and Doctrine Command. CASCOM is the designated Army agency for developing and recommending future support doctrine and structures.

CASCOM is proposing some revolutionary changes in the way business is done on the battlefield. Based on the requirements of the AirLand Operation doctrine they are proposing a shift from the current system of "pull" logistics, "in which unit commanders are responsible for bringing supplies with them into the field, to a "push" logistics system, with commanders relying on rear units for supplies."³⁷ In summary, the new combat service support for

AirLand Operations: shifts combat service support to a predictive, anticipatory system that is more distribution based and automation dependent; makes the maneuver units lighter and more maneuverable by consolidating all support at the forward support battalion and COSCOM levels; goes to a multifunctional support battalion concept in the COSCOMS as opposed to the current single function battalions; and places the entire combat service support burden on a single commander.

The proposed structure for aviation support follows the above tenants closely. At the aviation brigade level the changes will be dramatic if implemented. The brigade will finally receive its own support battalion. As currently envisioned, the forward support battalion-aviation (FSB-A) will be a multifunctional battalion of around 660 personnel. The FSB-A will have an Headquarters and Headquarters Company (HHC), Ground Repair Company (GRC), Supply and Transport Company, Subsystems Repair Company (SSRC), and a number of Systems Repair Companies (SRC). An SRC for each supported aviation battalion will be assigned to the FSB-A. The SRCs will have a habitual relationship with their supported battalion giving each battalion its own "mini" FSB.

The functions of AVUM and AVIM level maintenance are combined in the FSB-A. The SRCs supply AVUM level maintenance, and the SSRC provides AVIM level maintenance. Aviation battalions will no longer have their own AVUM company or personnel to run their forward area refuel and rearm points (FARP). These soldiers and capabilities move to the SRCs. A Forward Support Platoon (FSP)

from the SRC maintains a forward support section with each aviation company. The forward support section establishes an habitual relationship with the company it supports and provides limited AVUM capability. The planners at CASCOM believe this design will provide the following advantages: modular design; elimination of maintenance passback; forward support; increased mobility; AVIM capability forward; a unit designed to 100% of the MARC; and dedicated, tailororable support for the aviation brigade through all stages of the battle.

A separate organization, the aviation support company (ASC) has been developed for the traditional "orphans" in the aviation maintenance structure. The regimental aviation squadron of the armored cavalry regiment will now receive its own support company, but will also lose a major portion of their organizational strength to create the ASC.

At the Corps level, there is still debate about the final shape of the aviation support structure. The aviation community would like to create a multifunctional organization similar to the one for the brigade and call it the Aviation Support Group (ASG). CASCOM planners currently favor a single function Aviation Maintenance Group (AMG). The COSCOM would provide other forms of support. Once again, non-divisional brigades would lose large numbers of their organic maintainers to resource these organizations.

CONCLUSIONS AND RECOMMENDATIONS

MANNING. It would be nice to assume that the recommendations of ARCSA V will be accepted without debate, and that ample support personnel are provided to future aviation units. However, with the uncertain future of major force structure changes in a rapidly downsizing Army, the most likely outcome will be a prolonged debate and inadequate manning levels in aviation units for the next few years.

While waiting for the final resolution of the manning dilemma, there are things that can be done in the interim to improve the utilization of aviation personnel. As stated earlier in this paper, the productive maintenance man hours for aviation maintenance personnel are well short of the Army goal of 50%. A fundamental change is needed to improve that productivity.

Army commanders and leaders at all levels use the guidelines in FM25-100, "Training the Force," to train soldiers and units. They determine the critical tasks essential to successfully complete their wartime mission and create a mission essential task list (METL). Each task on the METL is analyzed to establish the training conditions and performance standards necessary to achieve realistic training. In addition to the METL there are a number of common tasks that all soldiers need proficiency in to ensure their survival on a battlefield.

Unfortunately, the business of maintaining often gets lost in

this process. Maintaining is viewed as "work," and work gets done when the training is over. This paradigm has to be broken. The primary weapon system of a helicopter maintainer is the helicopter itself, not a personal weapon like the M-16 rifle. Being an expert in the M-16 is important, but if sufficient helicopters can not fly, or have weapon systems that do not function because soldiers are training instead of maintaining, the unit METL can not be executed.

Maintenance training needs to be as thoroughly integrated into the unit training program as other tasks. Until maintenance can compete on an equal footing with other training requirements, it will always fall last in priority. Tasks, conditions and standards need to be established for each maintenance job. Standards for individual tasks need to be developed and mechanics should be held accountable if they do not meet those standards. Leaders must realize that every maintenance task is a training event and conduct them that way, even down to the detail of conducting an After Action Review (AAR) to see where they can improve. If the unit is not attaining the desired readiness standard, they are not combat ready. Until mechanics can attain enough proficiency in their maintenance tasks to put the unit into a ready state, other training might need to be deferred or reduced.

There are a number of improvements that will naturally appear when maintaining becomes training. Performance standards reduce scheduled maintenance times by holding soldiers accountable. Substandard mechanics are identified and can receive additional

training. All mechanics learn to perform tasks better and become more capable at maintaining their primary weapon - the helicopter. If maintaining does not become training, then all that is left is "work, work and more work," often in the hours after the normal training day, and usually with no identifiable reward or goal.

There are a number of obstacles to implementing a program like the one described above. Senior leaders often remove the commanders latitude to act. In United States Army Europe (USAREUR) the local training regulations largely mandate the way the training day must be utilized. Soldiers are required to take physical training three times a week, and a physical fitness test four times a year. Every Wednesday morning is blocked for training in individual common tasks and can not be used for anything else. Soldiers must qualify with their personal weapon twice a year.³⁸ Police call, billets upkeep, meals, practice for ceremonies, training holidays, mandatory inventories and personal equipment layouts, leave, sickcalls, and motor vehicle maintenance all erode the time available to train on the aircraft. The hours remaining must be closely protected by the aviation commander. Putting maintaining in competition with other training, and focusing on the ability to accomplish the unit METL, help to properly allocate the remaining manhours.

If improved management and training methodologies do not yield sufficient manhours to keep the unit aircraft ready, then more radical steps can be taken. A portion of the unit aircraft can be maintained in long term storage. Fewer aircraft would fly the same

number of flight hours, but would receive more focused maintenance. Aircraft would periodically rotate into storage so that all aircraft were exercised. The overlying principle in this approach is really quite simple, "Maintain only the aircraft you are resourced to maintain." However, the current methods of assessing unit readiness need some significant modifications to avoid penalizing aviation commanders' with aircraft in storage.

Increased use of flight and weapon simulators reduce the number of actual flight hours required to maintain pilot proficiency. Any reduction in flight hours automatically reduces scheduled and unscheduled maintenance requirements. Reduced flight hours coupled with rotating storage of selected airframes would significantly reduce the burden on maintainers and the demand for increasingly more expensive repair parts. However, a reduction in pilot flight hours could have the undesirable effect of reducing proficiency. Careful analysis needs to precede any increase in the proportion of simulator hours individual aviators fly. But the increasing sophistication of simulators should allow them to suffice for an increasing proportion of pilot training, with the advantages of saving money, resources, and aircraft maintenance.

SUPPORT STRUCTURE. The formation of FSB-A solves many support problems but creates a major dilemma. The majority of the manpower creating this unit will come from the aviation units. This is justified by CASCOM planners because it will "unburden" the maneuver commander.

Coincidentally, the United States Air Force has just announced that to make the operations of their flying squadrons more efficient, they will move organic maintenance back into them! For many years, flying squadrons consisted of only the pilots and a small contingent of enlisted soldiers. A separate maintenance organization provided all support. Air Force leaders now believe that type of organization is inefficient at the squadron level. By reincorporating the support personnel into the squadron, they believe that there will be more responsive maintenance, increased readiness, and a better awareness among Air Force commanders of how logistical considerations will effect their operations.³⁹ All of this while the Army heads in the opposite direction.

If the history of aviation maintenance is reviewed carefully, there seems to one common thread. Every effort to extract organic maintenance from organizational units failed when readiness became critical. In World War I the flying squadron was largely self contained and capable of doing most of its own maintaining. In World War II most work eventually was done at the unit level because it was quicker and more efficient. The Army augmented integrated direct support maintenance in aviation units in Viet-Nam

to the point where up to 80% of all work was done at the unit. Finally, a large portion of direct support maintenance was moved to the unit when the three level system was established during the 1970s'. OPERATION DESERT SHIELD/STORM did not last long enough to produce any substantial changes, but significantly enhanced maintenance capabilities were moved into the theater and unit capabilities were increased by pushing AVIM forward.

In the face of all this historical evidence the move by TRADOC to strip aviation units of their organic repair capabilities flies in the face of reason. Short term effects of this move will be serious. Battalion commanders need to be intimately involved in the control of logistic preparation, supply and maintenance. The unnecessary "friction" of separating those functions from a commanders direct control, adds a superfluous and artificial barrier that can eat up precious time on the battlefield.

Perhaps even more damaging are the long term effects of such a move. Today, aviation leaders at all levels intuitively understand that combat readiness is tied directly to maintenance. "Logistics are inexorably linked in the 'winning on the battlefield' equation."⁴⁰ It is a long education that begins the first day a young lieutenant leaves flight school and arrives at his unit. Young officers are immediately immersed in the complex tradeoffs required to keep aircraft readiness at a peak. They learn the importance of preventative maintenance and the value of closely monitoring scheduled maintenance to ensure only a small proportion of their aircraft are not ready at any one time. They

learn that there are no "simple fixes" and everything takes longer than it should. In other words, they learn to understand the inherent friction of maintaining aircraft and the many frustrations through direct involvement. To a large degree they function as their own maintenance officers. If the responsibility for logistics moves outside the organization, that training will never occur. Leaders will become detached from the business of logistics and the critical dynamics that it produces on the battlefield. A lesson the Air Force just relearned.

Organic maintenance and logistics capabilities are under resourced and almost broken. Aviation units struggle to contrive work arounds and make up for shortages in manpower by working longer. The FSB-A is an idea whose time has come, and Army aviation needs the "one stop support" it provides. But the current price is too high to pay if it means losing our already inadequate organic support capabilities. The FSB-A needs to be properly resourced from other personnel accounts or reconstructed as a smaller organization. Aviation is too valuable a combat multiplier to become entangled in a dangerous experiment that violates the lessons of history.

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